CLAIMS

What is claimed is:

1. A method of estimating a carrier frequency of a phase-modulated signal in which the modulation takes the form of a pulse train of phase jumps of a predetermined size such that an integer multiple of phase jumps equals 2π radians, the method including the following steps:

    a) extracting the pulse train from the signal,

    b) making an initial estimate of the carrier frequency,

    c) estimating an error in the initial estimate,

    d) using the error to generate a more accurate estimate of the carrier frequency,

    e) repeating steps c) and d) until an estimate of the carrier frequency having a desired accuracy is calculated.

2. A method as claimed in claim 1 in which step c includes extracting phase information in the signal, removing the initial estimate of the carrier frequency by mixing the signal down to 0 Hz to give complex IQ data, calculating the phase of the signal as a function of time, calculating the cyclic mean phase, wrapping the data into a phase range equal to the size of the phase jump, and calculating the average gradient of the data for a phase versus time graph, which gradient is proportional to the error in the initial estimate of the carrier frequency.

3. A method as claimed in claim 1 in which step c includes extracting phase information in the signal, calculating the phase of the signal as a function of time, calculating the cyclic mean phase, wrapping the data into a phase range equal to the size of the phase jump, and calculating the average gradient of the data for a phase versus time graph, which gradient is proportional to the error in the initial estimate of the carrier frequency, subtracting the average gradient, and summing the average gradient for each iteration.

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